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ABSTRACT

This paper describes an instrument designed to yield quick and reliable data on cognitive processes in classroom interactions; techniques of applying the instrument to classroom situations; findings on the reliability of the instrument; and implications for its uses as a research instrument or, when coupled with the paradigms developed by Nelson, Reynolds, and Abraham, as a feedback instrument and instructional device for the pre-service and in-service training of teachers. (Author)

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## The Classroom Observational Record

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## The Classroom Observational Record

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In recent years, a number of educational theorists, among them Benjamin Bloom (1956) and N. L. Gage (1963), have called for the development of classroom discussion strategies which contribute demonstrably to the strengthening of problem solving skills in pupils. Realistically, any efforts to develop such strategies must be preceded or accompanied by some system to record and assess the impact of the resultant classroom transactions upon the pupils. This paper reports the results of one effort to create such a system.

Analysis of the literature reveals that many instruments have been produced during the past decade which record with varying degrees of sophistication classroom verbal interactions. Attempts to deal with the cognitive processes, however, have proved cumbersome and difficult to apply readily in daily use. Bellack et al. (1966), Gallagher and Ashner (1963), Smith and Meux (1962), and Taba, et al. (1965) have all developed systems which utilize the direct mechanical recording of classroom verbal interactions and which subsequently analyze the recordings, or verbatim tape-scripts prepared from them, to determine the levels of cognition reflected in the verbal interactions. Through their efforts, these researchers have isolated verbal exchanges between two or more persons in the classroom which are indicative of the occurrence of cognitive processes and, more importantly, which show the relationship between certain kinds of verbal stimuli and the occurrence of verbal responses identified as reflecting higher level cognition. Such systems, however, have proven to be prohibitive for general application because of the amount of time required for transcription and

the need for several highly trained specialists to carry out the analysis.

The literature further reveals that attempts to deal with the affective elements of classroom verbal interaction have proved more successful. A number of systems easily applied in normal classroom environments have been developed. Many of these follow the conventions set forth in Flanders' (1965) system of Interaction Analysis in which verbal response is categorized and recorded at three-second intervals by a trained classroom observer. Such systems, however, were not designed primarily for the purpose of studying the cognitive aspects of classroom interaction and hence do not yield significant data on this area. Analysis of these instruments reveals two principal factors which preclude their adaptation for such use. First, they are primarily teacher centered and make few discriminations about the kind and quality of the pupil response; and second, they show final data in a matrix which illustrates the frequency of various kinds of interchanges, but does not permit the analysis of sequences of interchanges which is important to the consideration of cognitive processes.

On the basis of the literature, it appears, then, that there is need for a verbal interaction category system which deals primarily with cognitive processes and which combines the ease of application and reliability found in the Flanders-type systems with the discriminations of inferred cognitive processes found in the systems of Bellack, Gallagher and Ashner, Smith and Meux, and Taba. Such a system would greatly facilitate the development and testing of discussion models appropriate for the strengthening of cognitive skills in pupils.

Nelson, Reynolds, and Abraham (1971) examine initial considerations in

developing such a system. This paper describes the instrument which evolved as a result of these considerations, its uses in analyzing the cognitive processes which take place in classroom interactions, and its implications for pre-service and in-service training.

### The Instrument

The Classroom Observational Record (COR) is a 22-category instrument which has been developed to aid observers and teachers in analyzing the cognitive levels on which classroom verbal interactions take place. The categories have been adapted primarily from the Bellack and the Flanders systems, and the procedures used in their recording operate in much the same fashion as those in the Flanders system.

Central to the development of the COR has been the hypothesis that if teachers generally are to be successful in implementing classroom discussions which contribute to the strengthening of problem solving skills in pupils, certain planned strategies probably must be employed. To consider such strategies and their effects upon pupils, the concept of the Move has evolved. "Move" has been defined as any discrete verbal utterance having a single cognitive focus. This may be a word (i.e., No), a phrase (i.e., The paper in your hand), a question (i.e., What is the color of the paper in my hand?), or a statement made up of a sentence or series of sentences (i.e., The paper in your hand may be brownish red. It may also be russet. It may have some orange in it, too.).

Within the COR, twenty categories of Moves have been established along with two categories classified as Non-Moves. These have been divided into five major sub-divisions: (I) Structuring Moves; (II) Soliciting Moves; (III) Reacting Moves; (IV) Responding Moves; and (V) Non-Moves. The entire instru-

ment and the definitions of its various categories along with their numerical designators are as follows:

The Classroom Observational Record

I. Structuring Moves: Any statement which establishes a center of cognitive focus and does not directly elicit a verbal response is defined as a Structuring Move. The instrument defines three categories of Structuring Moves.

Reviewing (0): Summarizing one or more previous cognitive focuses from reading or class experience.

Informing (1): Presenting new facts, ideas, opinions, etc., about the content.

Directing (2): Giving instructions about actions to be carried out.

II. Soliciting Moves: Any question which (a) initiates a new transaction by establishing a new center of cognitive focus and/or (b) maintains an existing center of cognitive focus is defined as a Soliciting Move. There are four categories of Soliciting Moves.

Recalling (3): Calling for specific information about a previous cognitive focus(es) from reading or class experience (e.g., What was the Stamp Act?).

Collecting Data (4): Calling for specific information from direct observation of a book, chart, map, etc. (e.g., According to page 23 in your text, what were the causes of the Revolutionary War?).

Processing Data (5): Calling for comparisons, grouping, categorizing, labeling, differentiating properties, inferring, developing and using relationships or hypotheses, etc. (e.g., From the information we have, what conclusions can you draw about the effects the Stamp Act possibly had on the American people?).

Evaluating or Verifying Principles and/or Conclusions (6): Calling for application and testing of hypotheses, conclusions, or principles (e.g., In light of what you just said, how can you explain the actions of the merchants of New York City after the Stamp Act?).

III. Reacting Moves: Any response which (a) accepts or rejects, or (b) elicits evaluation, clarification, or explanation of an immediately preceding Move is

classified as a Reacting Move. There are eight categories of Reacting Moves.

Accepting (7): Expressing agreement with a previous Move(s).

Rejecting (8): Expressing disagreement with a previous Move(s).

Rejecting Personal Behavior (8'): Expressing disapproval of conduct (e.g., I don't like the way you are behaving; or, Sit in your chair and be quiet; or, Why are you making so much noise today?).

Calling for Clarification (9): Asking that a previous Move(s) be more fully explained (e.g., Do you mean that the Stamp Act really had very little effect on the American people?).

Calling for Evidence or Explanation (10): Asking that the rationale for a previous Move(s) be presented (e.g., Why do you say that the Stamp Act had little effect on the American People?).

Calling for the Opinion of Another Person (11): Asking that another individual evaluate a preceding Move(s) (e.g., Do you agree with Steven's statement, John?).

Answering a Raised Hand (N): Calling for a response by name only (e.g., John?) or by pointing and saying "yes?", etc.

Repeat (R): Repeating a preceding Move(s) (e.g., Q: Do you agree with Steven's statement? A: Do I agree with Steven's statement?).

IV. Responding Moves: Any statement in response to a Soliciting or Reacting Move is defined as a Responding Move. There are five categories of Responding Moves.

Recalling (3'):

Presenting Data (4'):

Processing Data (5'):

Evaluating or Verifying Data (6'):

I don't know (K):

(Responses correspond to criteria set up in sub-division II, Soliciting Moves.)

V. Non-Moves: Any occurrence which is not categorizable under the four preceding sub-divisions is categorized as a Non-Move. There are two categories of Non-Moves.

Silence (12)

Confusion (Z): Content of discussion not discernible.

Application of the Instrument

An observer who has memorized the categories of the COR and the numbers connected with them stations himself in the rear of a classroom and begins to record after the first Structuring or Soliciting Move. The tally sheet on which the data is recorded consists of two columns, one for teacher moves, the other for pupil moves. Use of the two columns eliminates the need for separate categories within the instrument for pupil and teacher talk and provides the advantage of making every category equally applicable for the description of either teacher moves or pupil moves. This has the effect of doubling the number of discriminations possible within the system as compared with the number possible in other systems without increasing the number or complexity of the categories.

A tally which records the appropriate numerical designator for the move in progress is made every three seconds. A check (✓) is made in the appropriate column if the speaker, type of move, and cognitive focus continue for another three seconds. A slash (/) is made between two moves when the speaker remains the same but the cognitive focus changes. If a new move occurs or if the speaker changes within the three-second interval, the new category is recorded. If an interaction is not discernible, for instance if two or more persons are speaking simultaneously, the symbol Z is recorded. A typical tally sheet is found in Figure 1 (see page 7).

The usefulness of the data display yielded by the instrument is apparent from Figure 1. Immediately after the encoded lesson, the data are ready for analysis. Visual scanning of the tally sheet indicates who did the talking;



FIGURE 1

A TYPICAL TALLY SHEET FOR THE COR.

T	S	T	S	T	S	T	S	T	S	T	S	T	S
3			2		✓		✓	6			12	N	
N			12		✓				6'		Demo		6
	3'		✓		✓	9	3'	10	5'		N		✓
$\frac{7}{3}$		1	✓		✓		✓		✓		5'		✓
12		3	3'	5	5'	3'R	✓		✓	10	5'		✓
✓			✓		✓		2		✓	10	3'	9	2
✓			✓	9	✓		1		✓		5'	9	6'
N	3'		✓		$\frac{✓}{3'}$		✓	10	4'		✓		✓
7	✓	$\frac{7}{3}$	3'		✓		✓		✓		✓		✓
	✓				✓			9	5'	10	6'		5'
7	9		✓	8'		Demo			✓	N	4'	Demo	✓
$\frac{✓}{3}$	3'		12	1	✓	4	4'	6	6'		✓	5	
	✓	1	✓	✓	✓		✓	9	K		✓	✓	5'
3	✓	N	5	✓		10	5'	10	K		5'	5'R	5'
7			✓		1	1	3'	6	K		✓		2
9	✓	5'	✓		3'	1	✓	5	6'	1	✓		5'
	✓	✓			✓		✓			✓		8	2
9	3'		9		✓		✓		12		12		✓
	✓	6'		1			✓	N	5'		Demo	✓	
9	✓	✓	✓	5	✓		5'		✓	5	5'	5	✓
$\frac{7}{3}$		✓	✓		5'		✓		12		✓	✓	✓
	3'		5		✓	1			✓		✓	✓	5'
$\frac{7}{3}$	3'		✓	9	✓	✓	8		✓		✓	10	✓
		9	✓		✓	✓	6'		✓	7	3'		5'
7	3'	1	✓	9	3'	✓	5'	10	✓	N		✓	✓
3		5R	3'	✓	✓	9	✓		✓	7		9	✓
✓			✓	5	5'	5'R	✓	9	6	✓		✓	✓
N			✓	1	✓	✓	✓		2	✓		11	5'
	3'		✓	3	3'	✓	✓			✓			
	✓		✓							✓			
	✓		✓							✓			
	✓		✓							✓			
	✓		✓							✓			

on what cognitive level(s) the interactions took place; the sequence of questioning levels; the level and duration of responses of pupils to the questioning; and the reactions of the teacher to the pupil responses.

For example, as illustrated in Figure 2, Soliciting Moves in the teacher column in Categories 3, 4, 5, or 6 with correspondent Responding Moves in the pupil column which are followed by Reacting Moves in Categories 7 and 8 in the teacher column would indicate that the teacher is verbalizing his value judgments concerning the adequacy of the pupil response to his questions. If the teacher's objectives call for development of problem solving skills by the pupils, such a strategy would probably be inappropriate because judgments are

FIGURE 2

SAMPLE TALLY SHEET, TEACHER VERBALIZING JUDGMENTS

T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S
1		7		✓			4'	7		✓		✓		3			
✓		3			4'		✓	1		✓		✓		✓			
✓		✓			✓		✓	✓			4'	✓			3'		
✓		✓			✓		✓	✓			✓	✓		8			
✓			3'		✓	7		✓			✓	✓		1			
✓			✓		✓	N		✓			✓	✓		✓			
✓		8		8			9	3		7		✓		✓			
✓		N		1			✓		3'	1		✓		✓			
✓			3'	✓		N			✓	✓		✓		3			
✓			✓	✓			4'		✓	✓		✓			3'		
✓			✓	✓			✓	7		✓		✓			✓		
✓			✓	✓			✓	1		✓		✓		7			
✓			✓	✓			✓	✓		✓		✓		1			
✓			✓	4			✓	4		✓		✓		✓			
3		7															
	3'	4															
	✓	✓															

being verbalized primarily by the teacher, and there appears to be little or no opportunity for pupils to demonstrate that they are engaged in the cognitive processes which presumably underlie the verbalization of such judgments.

On the other hand, as illustrated in Figure 3, teacher Soliciting Moves

in Categories 3, 4, 5, or 6 with correspondent pupil Responding Moves which are followed primarily by teacher Reacting Moves in Categories 9, 10, and 11 and appropriate pupil Responding Moves would indicate that the teacher is withholding his value judgments concerning pupil response to his questions. In the place of such judgments, he is calling upon pupils to respond to his initial Soliciting Moves in greater detail and to verbalize their judgments of the adequacy of the response of their peers. The findings of Abraham, Nelson, and Reynolds (1971) suggest a positive relationship between the application

FIGURE 3  
SAMPLE TALLY SHEET, TEACHER WITHHOLDING JUDGMENTS

T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S
0		N			5'		✓		5'		✓		8		✓
/			3'		/		✓		/		5'	11		7	
/			/		/		✓		11		5'		✓	10	
/			✓	11		10			5'		✓		✓		4'
/		11			7	✓			✓		✓	1			✓
/			8		5'		5'		✓		✓	✓			✓
/			5'		✓		✓		✓		✓	✓			✓
3			✓		✓		✓	11		N		✓		7	
	3'		✓		✓	10			8		7		✓	0	
	✓		✓		✓	✓			5'		5'	6		✓	
9		R		10		4'			✓		✓	✓	12		✓
	3'	/		12		✓			✓		✓		✓		✓
/	/	/		✓		✓			✓		✓		✓		✓
/	/	9		N		/			4'	N		6'		✓	
/	/		7		5'	5			✓		7		✓		✓

of this type of strategy and increases in selected pupil problem solving skills, particularly when the strategy is used in conjunction with sequences of Soliciting Moves which escalate from Categories 3 and 4 to Categories 5 and 6.

From these examples, it is apparent that the instrument provides easily accessible information which can be of importance in providing feedback to teachers about their own classroom performance and that of their pupils.

Further, the information can assist them in devising and carrying out strategies aimed at giving pupils practice in such skills as questioning assumptions and consequences, devising tests, or interpreting data, all of which are key elements of problem solving.

#### Reliability of the Instrument

Medley and Mitzel (1963) propose a method for determining the reliability of classroom observational instruments. This method was applied to data yielded by the COR. The results indicated that coefficients of observer agreement ranged from .64 to .99 for the 22 categories, while the coefficients of discrimination ranged from .68 to .99.

#### Implications

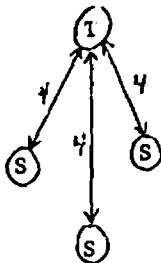
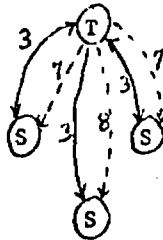
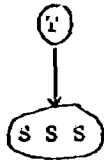
Nelson, Reynolds, and Abraham (1971) have developed paradigms which depict various kinds of classroom verbal interactions. As is illustrated in Figure 4, the COR is able to "detect" the sequences of verbal interactions which comprise these paradigms with a high degree of accuracy. Thus it is possible for a teacher to plan a strategy of interaction utilizing one or more of the paradigms, to put the strategy into operation in the classroom in the presence of a COR-trained observer, and to gain almost instantaneous feedback at the close of the lesson on how closely the strategies were actually followed. Further, the data yielded by the COR indicate where any deviations from the planned strategy may have taken place, as well as the character of the deviations in terms of the resultant kinds of interactions and the cognitive levels on which such interactions occurred.

The COR has also been applied as a research instrument. The following is an example of one such application. An observer had been using the COR to record the discussions which took place in elementary school science class-

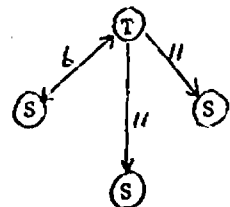
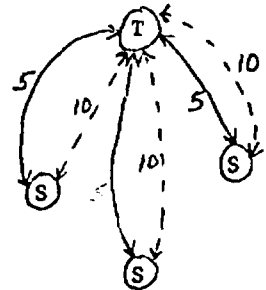
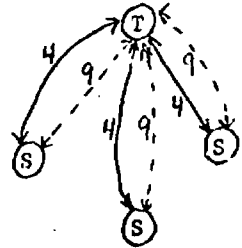
FIGURE 4

COR DATA DISPLAY AND ITS RELATIONSHIP  
TO SELECTED DISCUSSION PARADIGMS

T	S
1	
✓	
✓	
✓	
✓	
✓	
✓	
✓	
3	3'
8	✓
N	3'
	✓
	✓
$\frac{7}{3}$	3'
	✓
$\frac{8}{N}$	3'
	✓
7	
4	
✓	4'
	✓
	✓
N	4'
	✓
	✓
N	4'
	✓



T	S
4	
✓	4'
9	✓
4	✓
	4'
	✓
9	✓
	4'
	✓
5	5'
	✓
	✓
10	4'
	✓
5	5'
	✓
	✓
10	3'
	✓
6	6'
	✓
	✓
11	6'
	✓



rooms after the completion by pupils of laboratory experiments. The objectives of the discussions were to develop pupils' abilities to formulate inferences, to apply the information gained to new situations, or to open areas of further investigation. The observer noticed that there were two poles from which the discussions took place. One, a teacher-centered pole, where the teacher did the analyzing, concluding, and testing; the other, a pupil-centered pole, where the pupils accomplished the major part of these tasks for themselves. This observation led to the development of paradigms for these two polar strategies. The effects of the strategies on pupils were then experimentally tested. All factors were held constant except for the post-laboratory discussion periods during which pre-trained teachers role-played the two strategies. The classroom performance of the pre-trained teachers was monitored through daily COR recording and systematic feedback in an effort to insure close adherence to the identified strategies. Through this mechanism, close adherence was maintained. This experiment and its results are further detailed by Abraham, Nelson, and Reynolds (1971).

The preceding example illustrates the potential usefulness of the COR as a research instrument. In this case, the application of the COR led initially to the identification of an area for examination. It was then used to infer paradigms for discussion strategies. Teachers were trained to role-play these strategies, and their subsequent classroom performance was monitored through daily COR recording. On the basis of the data yielded by the COR, systematic feedback was provided to the teachers which enabled them to adhere closely to the strategies as depicted in the paradigms.

This example also illustrates what appears to be the considerable potential of the COR when used in conjunction with the paradigms as a tool

for both the pre-service and in-service training of teachers. Such uses have yet to be experimentally tested; however, empirical and subjective evidence suggests the following as fruitful hypotheses for future exploration:

COR data and paradigms appear to influence the classroom verbal behavior of pre-service teachers when used as tools to provide systematic feedback on performance.

COR data and paradigms appear to influence the classroom verbal behavior of in-service teachers when used as tools to provide systematic feedback on performance.

Training in the use of the COR alone without systematic feedback on performance does not appear to influence the classroom verbal behavior of pre-service teachers.

Training in the use of the COR alone without systematic feedback on performance does not appear to influence the classroom verbal behavior of in-service teachers.

Introduction to the COR system and paradigms appears to influence the development of the concept of cognitive sequencing in pre-service teachers.

Introduction to the COR system and paradigms appears to influence the development of the concept of cognitive sequencing in in-service teachers.

Use of the COR system and paradigms in analysis of video-taped teaching behaviors appears to be an effective tool in developing conceptual models of various kinds of teaching tactics and strategies in pre-service teachers.

Use of the COR system and paradigms in analysis of video-taped teaching behaviors appears to be an effective tool in broadening the range of conceptual models of various kinds of teaching tactics and strategies in in-service teachers.

The COR system and paradigms appear to be powerful instruments for influencing the development of selected verbal teaching behaviors when used in a combination of pre-service instruction and controlled supervisory feedback during the initial teaching experiences.

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